

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE  
BOARD OF PATENT APPEALS AND INTERFERENCES**

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In re Patent Application of: Jyoti Mazumder

Application No.: 10/629,062

Confirmation No.: 5850

Filed: July 29, 2003

Art Unit: 1762

For: FABRICATION OF CUSTOMIZED DIE  
INSERTS USING CLOSED-LOOP DIRECT  
METAL DEPOSITION (DMD)

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Examiner: M. L. Padgett

**APPELLANT'S CORRECTED APPEAL BRIEF**

Mail Stop APPEAL BRIEF  
Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450

Dear Sir:

In response to the Notification of Non-Compliant Appeal Brief mailed April 10, 2008, Appellant hereby submits its corrected Appeal Brief.

**I. Real Party in Interest**

The real party in interest in this case is Jyoti Mazumder, Applicant and Appellant.

**II. Related Appeals and Interferences**

There are no appeals or interferences which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

**III. Status of Claims**

The present application was filed with 20 claims. Claims 7-8 and 10-11 have been canceled, and claims 12, 13 and 15-20 have been withdrawn from consideration. Claims 1-6, 9 and 12-20 are pending; however, claims 1-6, and 14 are rejected and under appeal. Regarding claim 9, Appellant

filed a Terminal Disclaimer, which has been entered and approved. Claim 1 is the sole independent claim.

#### **IV. Status of Amendments**

No after-final amendments have been filed.

#### **V. Summary of Claimed Subject Matter**

Independent claim 1 resides in a method of enhancing a mold, die, or tool having a body with a working surface. In particular, the body 302 is composed of aluminum or an alloy thereof, and the working surface is modified through the application of a metallurgically bonded molybdenum alloy 304 directly from CAD data using a closed-loop, direct metal deposition (DMD) process. (Specification, page 8, line 13 to page 9, line 4).

#### **VI. Grounds of Rejection To Be Reviewed On Appeal**

A. The rejection of claims 1-6 and 14 under 35 U.S.C. §103(a) as being unpatentable over Skszek (6,472,029B1) or (2002/0165634 A1)), or Mazumder et al. ((2002/0142107) or (2005/0121112)). in view of Hirakawa (4,505,485).

B. The rejection of claims 1-6 and 14 under 35 U.S.C. §103(a) as being unpatentable over Koch et al. (6,122,564), (optionally in view of Jeantette et al. (6,046,426)), and further in view of Hirakawa (4,505,485).

C. The rejection of claims 1-6 and 14 under 35 U.S.C. §103(a) as being unpatentable over Lewis et al. (5,837,960), (optionally in view of Koch et al. (6,122,564), or Jeantette et al. (6,046,426)), and further in view of Hirakawa (4,505,485).

#### **VII. Argument**

A. The rejection of claims 1-6 and 14 under 35 U.S.C. §103(a) as being unpatentable over Skszek (6,472,029B1) or (2002/0165634 A1)), or Mazumder et al. ((2002/0142107) or (2005/0121112)). in view of Hirakawa (4,505,485).

B. The rejection of claims 1-6 and 14 under 35 U.S.C. §103(a) as being unpatentable over Koch et al. (6,122,564), (optionally in view of Jeantette et al. (6,046,426)), and further in view of Hirakawa (4,505,485).

- C. The rejection of claims 1-6 and 14 under 35 U.S.C. §103(a) as being unpatentable over Lewis et al. (5,837,960), (optionally in view of Koch et al. (6,122,564), or Jeantette et al. (6,046,426)), and further in view of Hirakawa (4,505,485).

Appellant's claim 1 is very specific. The invention resides in method of enhancing a mold, die, or tool having a body with a working surface. The body is composed of aluminum or an alloy thereof, and the working surface is modified through the application of a metallurgically bonded molybdenum alloy directly from CAD data using a closed-loop, direct metal deposition (DMD) process.

The claim stands rejected under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent No. 6,472,029 to Skszek or U.S. Publication No. 2002/0165634 to Skszek, or U.S. Publication Nos. 2002/0142107 or 2005/0121112 both to Mazumder et al., in view of U.S. Patent No. 4,505,485 to Hirakawa. The claim also stands rejected under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent No. 6,122,564 to Koch et al., optionally in view of U.S. Patent No. 6,046,426 to Jeantette et al., or over U.S. Patent No. 5,837,960 to Lewis et al., and further in view of U.S. Patent No. 4,505,485 to Hirakawa.

It is noted that this rejection results in so many possible combinations and permutations, that it is difficult but not unfeasible to respond to them all. Nevertheless, despite the Examiner's protracted arguments, Appellant's specific claim limitations are not taught by the prior art, alone or in combination. On page 5 of the Final OA, the Examiner concedes that "Koch et al. do not teach the presently claimed combination of aluminum body, with a metallurgically bonded coating." On page 6, the Examiner concedes that "Skszek differ from the claims as amended by not be [sic] directed to coating and aluminum body with a molybdenum alloy." On page 7, the Examiner admits that "[w]hile the Mazumder et al. references have claimed Al or Al-Si substrates, they differ by not having the molybdenum coating." On page 8, the Examiner concedes that [a]s amended at the present [sic] the claims differ [from Lewis] by requiring an aluminum body, with a metallurgical molybdenum coating."

The rejection hinges on the teachings of Hirakawa. "While none of the various primary references or combinations of references teach the specific combinations of molybdenum alloy bonded to aluminum... (Final OA, p. 9, emphasis added), it would be obvious to import the teachings of Hirakawa "as it shows the desirability of using this specific material combination." Appellant respectfully disagrees.

Hirakawa resides in a rotary seal providing relatively moveable surfaces in the form of a hardened wear resistant lay formed in a helical fashion. Without citing any reference in particular, the Examiner states on page 11 of the Office Action that “applicable base metals include various steels or aluminum (alloys) or Al-Si alloy where the wear-proof layer may be Cr-Mo or Mo-Ni-Cr or include molybdenum mixed with a carbide or C. The Examiner then goes on to cite certain sections of Hirakaw which talk only about wear resistance and so forth, and do not provide any motivation to combine the various references and combinations. The Examiner even concedes that Applicant’s invention would not result if these combinations were made, since the Examiner states “with or without teachings of aluminum substrates.”

The Examiner’s specific grounds for making the combination is that “it shows the desirability of using the specific material combination, as well as teaching its formation via a laser technique process, which is suggestive of or compatible with the more specific laser deposition processes of the primary references/combinations, where the primary references/combinations provide motivation for using their technique due to its superior controllability, etc., as disclosed therein.” This is not a motivation to combine. This is simply a list of observations made by the Examiner, and would not lead one of skill in the art to use the limitations set forth in Applicant’s claims. And again, even if these various combinations were made, Applicant’s invention as claimed would not result, thereby further precluding *prima facie* obviousness.

### Conclusion

In conclusion, for the arguments of record and the reasons set forth above, all pending claims of the subject application continue to be in condition for allowance and Appellant seeks the Board’s concurrence at this time.

Respectfully submitted,

By: 

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Date: May 12, 2008

APPENDIX ACLAIMS ON APPEAL

1. A method of enhancing a mold, die, or tool, comprising the steps of:  
providing a mold, die or tool having a body with a working surface;  
the body being composed of aluminum or an alloy thereof; and  
modifying the working surface of the body through the application of a metallurgically bonded molybdenum alloy directly from CAD data using a closed-loop, direct metal deposition (DMD) process.
2. The method of claim 1, wherein at least a portion of the working surface is modified to improve wear resistance.
3. The method of claim 1, wherein at least a portion of the working surface is modified to improve resistance to dissolution during a die casting operation.
4. The method of claim 1, wherein at least a portion of the working surface is modified to improve oxidation resistance.
5. The method of claim 1, wherein at least a portion of the body is modified to incorporate cooling channels to improve thermal management.
6. The method of claim 1, wherein at least a portion of the body is modified to incorporate conductive heat sinks or thermal barriers to improve thermal management.
9. The method of claim 1, wherein at least a portion of the body is cast aluminum-silicon.
14. The method of claim 1, wherein the closed-loop DMD process is based upon a robotic implementation of the DMD process.

**APPENDIX B**

**EVIDENCE**

None.

**APPENDIX C**  
**RELATED PROCEEDINGS**

None.